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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,537	09/20/2005	Geert-Hendrik Koops	019219-025	2591
21839 7590 01/23/2009 BUCHANAN, INGERSOLL & ROONEY PC POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404			EXAMINER SYKES, ALTREV C	
			ART UNIT 1794	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

Office Action Summary	Application No. 10/519,537	Applicant(s) KOOPS ET AL.	
	Examiner ALTREV C. SYKES	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20080924</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Examiner acknowledges the amendment to the claims filed September 24, 2008. Claim 8 has been cancelled. Claims 1-7 and 9-35 are pending in the application.

Drawings

2. The drawings were received on December 28, 2004. These drawings are accepted by examiner.

Information Disclosure Statement

3. The information disclosure statement filed September 24, 2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the following information referred to therein has not been considered: DD 233385, since applicant has not provided an English translation of said document.

Claim Objections

4. In view of the amendment filed, the objection of claims 26, 30, 32, and 34 has been withdrawn thereby correcting for the minor informalities as set forth in the previously mailed office action.

Response to Arguments

5. Applicant's arguments, see pg. 9, filed September 24, 2008, with respect to rejections under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. In view of the amendment to the claims, the rejection of claims 22, 27, and 32-34 has been

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withdrawn. Additionally, the rejection of claims 32-34 under 35 U.S.C. 101 for being recitations of use without setting forth any process steps has also been withdrawn.

Applicant's arguments with respect to claims 1, 3, 4, 8-15, 17-23, 25-29 and 31-34 rejected under 35 U.S.C. 102(e) as anticipated by Yu et al. (US 6,497,953) have been considered but are moot in view of the new ground(s) of rejection necessitated by the amendment to claim 1. As the primary reference is no longer being applied the arguments against the remaining rejections of claims 2, 5-7, 16, 24, and 30 under 35 U.S.C. 103(a) have been considered but are also moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 6, 7, 9-22, 25-32, and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Miller et al. (US 6,500,233) as evidenced by Dongfei et al. (SG 80604)

Regarding claim 1 and 29, Miller et al. discloses methods for making separation membranes. (See Abstract) Miller et al. discloses one method for preparing hollow fibers is to melt the polymer, mix in the zeolite particles, and extrude the polymer/zeolite blend through a tubular capillary nozzle with a core fluid used for the purpose of retaining the hollow fiber shape. Another method involves extruding a polymer spin dope (or spinning solution) formulation including zeolite particles through a spinneret to provide a nascent

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hollow fiber. The nascent fiber is then contacted with a fluid to coagulate the fiber into a polymer membrane, thus entrapping the zeolite particles in the polymer membrane. (See Col 2, lines 24-34) Miller et al. discloses the polymer is preferably porous. (See Col 9, lines 25-39) Specifically regarding applicants limitations of a two-step phase inversion process, Miller et al. discloses in air-gap spinning, a polymer solution is extruded through a spinneret suitable for forming the hollow fiber. While the fiber is spinning, a gas or liquid may be injected into the bore of the hollow fiber extrudate to maintain the configuration of the hollow fiber. The resulting hollow fiber extrudate travels through an air-gap prior to coagulation by known techniques, for example contacting the extrudate with a non-solvent for the polymer. (See Col 7, lines 55-64) Further regarding the two-step phase inversion process of applicant, Miller et al. discloses three-way co-extrusion can be used to form the membranes (i.e. fiber). In this type of method, gas or liquid is extruded through the center to form a void. A polymer, preferably a porous polymer, is used as a support, and is extruded next to and around the gas or liquid. The polymer/zeolite mixture is added next to and around the support layer, forming an asymmetric hollow fiber. Alternatively, the polymer/zeolite can be next to and around the gas/liquid, and the polymer support layer can be extruded on next to and around the polymer/zeolite layer. The zeolite particles (40) are encapsulated by the polymer matrix. As such, examiner notes that the two steps as claimed by applicant are anticipated by the Miller et al. prior art.

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Regarding claim 2, Miller discloses the concentration of the polymer in the polymer solution is preferably 0.25 to 0.30 by total weight of the spin dope solution. The zeolite loading in the spin dope is between 0.10 and 0.40. (See Col 6, lines 9-17)

Regarding claim 3, Miller discloses preferably, the solvents include NMP, DMAc, DMF, and DMSO. (See Col 4, lines 40-52)

Regarding claim 6, Miller et al. discloses the ratio of zeolite/polymer is typically between about 0.05 and 0.4, preferably about 0.2 to 0.4, by weight. (See Col 2, lines 15-17) Therefore, examiner notes that the ratio of Miller et al. is obtained by using for example 10 percent zeolite and 25 percent polymer by weight. (See also Col 6, lines 9-17)

Regarding claim 7, Miller et al. discloses membranes comprising greater than 60% zeolite tend to be brittle. (See Col 5, lines 19-21) Examiner notes that while Miller et al. prefers the particulate amount to be less than 60%, the limitation is still anticipated by the prior art.

Regarding claims 9-11, Miller et al. discloses while the fiber is spinning in the spinneret, a bore fluid is injected within the bore of the fiber to assist in maintaining the configuration of the fiber. The bore fluid can be a mixture of a solvent and a non-solvent for the polymer to permit a slow rate of coagulation and to permit draw down of the fiber. Miller et al. discloses the bore fluid may be an inert gas such as N₂. Miller et al. further discloses suitable bore fluids also include water. (See Col 8, lines 31-40) Therefore, examiner equates the bore fluid to the exterior medium of applicant.

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Regarding claim 12, Miller et al. discloses the spinneret used to form the fiber membranes is generally of the tube-in-orifice type. (See Col 8, lines 21-25) Miller et al. also discloses three-way co-extrusion can be used to form the membrane. (See Col 9, lines 35-36) As such, examiner notes that one skilled in the art would have readily used a triple layer spinneret in order to carry out the three-way co-extrusion as disclosed by Miller. Further, as evidenced by Dongfei et al. (SG 80604), hollow fiber membranes are known to be extruded with a triple orifice spinneret wherein the nascent fiber is passed through an air gap after leaving the spinneret and further solidified in a coagulation medium to form the membranes.

Regarding claim 13, Miller et al. discloses suitable polymers include polyvinylidene fluoride. (See Col 3, lines 40-41)

Regarding claim 14, Miller et al. discloses the zeolite can be subjected to cation modification. (See Col 4, lines 20-23) The zeolite may also be silanated, either during wet milling or separately to improve bonding between the zeolite outer surface and the polymer. (See Col 4, lines 27-30)

Regarding claim 15, examiner notes that one of ordinary skill in the art would recognize zeolite as a known adsorptive material as evidenced by its frequent use in filter materials. (See also Col 4, lines 19-20)

Regarding claim 16, examiner notes that a zeolite is also called an ion exchange resin, particularly when used as a water softener as would be known by one of ordinary skill in the art.

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Regarding claim 17, Miller discloses MFI zeolites such as silicalite can be used as the particulate material. (See Col 4, lines 13-14) Silicalite is a hydrophobic crystalline silica-based molecular sieve. (See Col 4, lines 7-9) As such, examiner notes that the limitation is anticipated by the prior art.

Regarding the limitation of claims 18-21 it should be noted that the recitation of “the particulate material is used for size exclusion, separation of isomeric compounds, separation of optically active compounds, or used in reverse phase chromatography” are considered to be intended use statements and are not given patentable weight at this time since the prior art meets the structural and/or chemical limitations set forth and there is nothing on record to evidence that the prior art product could not function in the desired capacity or that there is some additional implied structure associated with the term. The burden is shifted upon the Applicant to evidence the contrary. Further, Miller discloses the membranes may be used for commercial purifications. (See Col 5, lines 1-3) Miller et al. also discloses routine experimentation can be used to optimize m-xylene/p-xylene separations. (See Col 4, lines 21-23)

Regarding claim 22, Miller et al. discloses a catalyst comprising a type L zeolite containing at least one Group VIII metal to produce aromatics and hydrogen. (See Claim 13, Col 14, lines 3-7) Examiner notes that the claims of the patented Miller et al. prior art constitute a part of the disclosure. Therefore, examiner has reason to believe that the limitation of a particulate material functionalized by a catalyst is still anticipated by the prior art reference even though not elaborated on explicitly.

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Regarding claim 25, Miller et al. disclose the nascent fiber may travel through an air gap of elevated temperatures. (See Col 8, lines 47-52) Miller et al. also discloses the fiber membranes are washed by placing the fibers in water at 25 to 100° C. (See Col 9, lines 17-20)

Regarding claim 26-28, Miller et al. discloses the particle size of the zeolites is less than 5 microns and can be reduced after synthesis. (See Col 4, lines 24-28) The zeolite loading in the spin dope is between 0.10 and 0.40. (See Col 6, lines 9-17) Miller discloses cation modification of zeolites can be used to affect the m-xylene/p-xylene separation. Routine experimentation can be used to optimize these separations. (See Col 4, lines 21-23) Examiner notes that modifying the any parameter of the particulate material would control porosity of the polymeric matrix.

Regarding claim 30 and 31, Miller et al. discloses hollow fibers can be employed in bundled arrays potted at either end to form tube sheets and fitted into a pressure vessel thereby isolating the insides of the tubes from the outsides of the tubes. Devices of this type are known in the art. (See Col 9, lines 50-55) Therefore, examiner equates the devices as disclosed by Miller et al. to the module comprising fiber in an orderly fiber packing configuration inside a housing. Examiner equates the pressure vessel of Miller et al. to the body of applicant. It is noted that the fiber being in a finely divided form is optional as claimed by applicant.

Regarding claim 32 and 34, Miller et al. discloses a method for making composite membranes capable of separating p-xylene from mixtures including p-xylene and m-xylene, and processes for purifying p-xylene using the membranes. (See Abstract)

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Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 4, 24, 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US 6,500,233).

Regarding claim 4, Miller et al. discloses additives may be added to the solvent. (See Col 5, lines 66-67) However, the reference is not explicit to the amount. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the weight percent of additives since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The burden is upon the Applicant to demonstrate that the claimed weight percent of additives is critical and has unexpected results. In the present invention, one would have been motivated to optimize the weight percent of

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additives motivated by the desire to modify the strength, heat resistance, and durability of the final membrane structure. (See Col 5, lines 1-3)

Regarding the limitation of claim 24 it should be noted that the recitation of “for mechanical enforcement” is considered to be intended use statements and are not given patentable weight at this time since the prior art meets the structural and/or chemical limitations set forth and there is nothing on record to evidence that the prior art product could not function in the desired capacity or that there is some additional implied structure associated with the term. The burden is shifted upon the Applicant to evidence the contrary. Additionally, Miller et al. also discloses three-way co-extrusion can be used to form the membrane in which a gas or liquid is extruded through the center to form a void. (See Col 9, lines 35-36) While Miller et al. does not explicitly teach the use of a thread, wire, or yarn to be co-extruded with the fiber, examiner has reason to believe that one of ordinary skill in the art at the time of the invention motivated by expected success would have appreciated the suggestion of a three-way co-extrusion in order to modify the strength of the membrane. By the suggestion of a liquid being extruded through the center, one of ordinary skill in the art would have only required routine experimentation to substitute the liquid for a fiber/wire forming solution to provide for the limitation as claimed by applicant. The modification would have also been motivated by the desire to tailor the membrane for its use in commercial purifications as disclosed by Miller et al. (See Col 5, lines 1-3)

Regarding the limitation of claim 33 it should be noted that the recitation of “for immobilization of” is considered to be intended use statements and are not given

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patentable weight at this time since the prior art meets the structural and/or chemical limitations set forth and there is nothing on record to evidence that the prior art product could not function in the desired capacity or that there is some additional implied structure associated with the term. The burden is shifted upon the Applicant to evidence the contrary. Additionally, while Miller et al. does not specifically disclose a method for the immobilization of a catalyst in a reaction mixture, examiner has reason to believe that the separation membranes would have been easily tailored for such a separation since Miller et al. discloses the membranes may be used in commercial purifications. (See Col 5, lines 1-3) Additionally, Miller discloses the polymer used for the membranes is chosen based on the mixtures to be separated. (See Col 3, lines 26-27) Therefore, one of ordinary skill in the art would have been easily motivated by expected success to modify the membrane of Miller et al. for specific purification/separations as claimed by applicant.

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US 6,500,233) as applied to claim 1 above and in view of Wang et al. (US 5,834,107)

Regarding claim 5, Miller et al. disclose all of the claim limitations as set forth above, but the reference does not disclose the additives are octanol, polyvinylpyrrolidone, polyethylene glycol, or glycerol.

Wang et al. discloses highly porous synthetic polymeric membrane materials which comprise a dope mix containing polyvinylpyrrolidone or polyethylene glycol as additives. (See Abstract and Col 14, lines 4-6) These polymers may enhance the

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viscosity of the dope mix, and may also affect the porosity and pore structure. (See Col 14, lines 6-8)

As Miller et al. and Wang et al. are both directed to porous polymeric membranes, the art is analogous. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention motivated by expected success to utilize the additives of polyvinylpyrrolidone or polyethylene glycol as taught by Wang et al. in the membrane as disclosed by Miller et al. in order to enhance the viscosity of the dope mix, and may also affect the porosity and pore structure. (See Col 14, lines 6-8)

12. Claims 23 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US 6,500,233) as applied to claim 1 above and in view of Boggs et al. (WO 00/02638)

Regarding claims 23 and 35, Miller et al. discloses all of the claim limitations as set forth above, but the reference does not disclose the particulate material is active carbon. The reference is also silent as to the mixture of compounds or the reaction mixture is a cell broth.

Boggs et al. discloses membranes for removing organic compounds that have been added to a biological fluid which include a polymeric matrix and a particulate material immobilized within the matrix. More particularly the membranes are used to remove pathogens from blood. (See Abstract and pg. 1, lines 10-20) Therefore, examiner equates the biological fluid of blood which inherently contains blood cells and platelets to the cell broth as claimed by applicant. Boggs et al. further discloses the particulate

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material should likewise be capable of being combined with the selected polymer. Where the membrane is used to absorb selected organic compounds from a biological fluid, the particulate material may be a sorbent. Sorbents in powdered form may be preferred (over, for example, beads or other larger particles) so that the membrane will have a smoother surface and, thus, be less abrasive to the fluid which it contacts and the components therein. In addition, a powdered sorbent may be more effectively immobilized by the polymer. Of course, selection of the sorbent may also depend, in part, on the affinity of the compound to be removed for the particular sorbent. Activated charcoal is a known and preferred sorbent. (See pg. 13, lines 15-29) The polymeric materials and particulate materials are combined to form a slurry-like blend. (See pg. 14, lines 18-35) Suitable solvents include NMP and DMAc. (See pg. 16, lines 5-10)

As Miller et al. and Boggs et al. are both directed to methods for making polymeric membranes comprising particulate material, the art is analogous. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the activated charcoal as the particulate material in the fibers as disclosed by Miller et al. motivated by expected success to provide membranes for commercial purifications such as for biological fluid. (See pg. 1, lines 10-14) The substitution of one adsorbent material for another would have been completely within the ordinary skill of one in the art at the time of the invention.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were

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made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALTREV C. SYKES whose telephone number is (571)270-3162. The examiner can normally be reached on Monday-Thursday, 8AM-5PM EST, alt Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1254. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ACS/
1/8/09

/Norca L. Torres-Velazquez/
Primary Examiner, Art Unit 1794